Every Drop of Water Holds a World of DNA

Now Available

Isolate **RNA** from Water

PowerWater® RNA Isolation Kit
Catalog No. 14700

www.mobio.com/water

PowerWater® DNA Isolation Kit -
Utilizes patented IRT to obtain pure results from even the most turbid water*

RapidWater™ DNA Isolation Kit -
Next generation kit for fast isolation of DNA from non-turbid water

UltraClean™ Water DNA Isolation Kit -
The original, trusted kit for use with multiple filters and large filter DNA extraction

**Inhibitor Removal Technology*

Catalog No.	Description
14900	PowerWater® DNA Isolation Kit
14810	RapidWater™ DNA Isolation Kit
13000-V1-5	Vortex Adapter for Vortex-Genie® 2, Holds 6 (5 ml) Tubes

MO BIO Laboratories, Inc.

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Please see our website for kit information including prep quantity and filter choices

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Application Forum

Inhibitor-free DNA Purification from Water Samples

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Introduction

A streamlined method for DNA purification from water samples for microbial detection and quantification is highly desirable for both research and water quality testing. A number of methods are used, but the fastest methods involve the binding of nucleic acids to silica spin columns. The efficiency of purifying DNA using silica spin columns is not always balanced with the goal of obtaining high-quality DNA from complex samples. In many cases, inhibitors are not removed, negatively affecting downstream applications. The MO BIO Laboratories PowerWater® DNA Isolation Kit was developed to isolate high-quality, inhibitor-free DNA from diverse water samples.

Lysis Optimization

A number of filter membrane types are used for water research and testing which differ in composition, pore size, and capacity. As a result, lysis efficiency can vary. Cell lysis was optimized for the most commonly used filter membrane types (Figure 1). Optimization included a more robust lysis buffer and use of larger bead tubes containing a novel garnet bead mix. All of these modifications yielded a faster protocol by minimizing vortex time.

Inhibitor Removal

Sample inhibition in the form of suspended solids and dissolved compounds can influence target DNA isolation and detection. Patented Inhibitor Removal Technology® (IRT), for the removal of PCR inhibitors, is a key component in the PowerWater® protocol allowing for better amplification of target DNA.

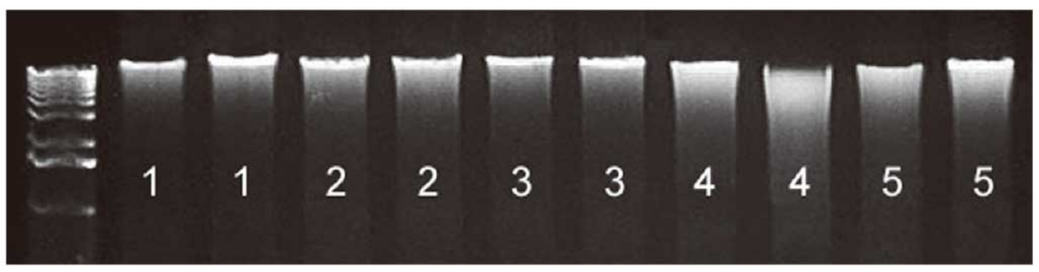

Figure 1. DNA results from bacteria (2 mL of an overnight Escherichia coli culture) spiked water samples. Samples were vacuum filtered, in duplicate, through five different membrane types (1 = polyethersulfone, 2 = cellulose acetate, 3 = cellulose nitrate, 4 = polycarbonate, 5 = aluminum oxide) and the DNA isolated using the PowerWater® DNA Isolation Kit. Total yields were highly comparable, averaging 5.3 µg ± 0.77 µg.

Column Binding And Elution

Binding DNA to silica membranes relies on chaotropic salts, with some salts facilitating binding better than others. To optimize this step, different formulations were evaluated to identify a solution that provided maximal binding in the smallest possible volume. Efficient binding combined with improved wash buffers and elution into 100 µL volume yielded ready-to-use purified DNA from the most difficult type of water sample (Figure 2).

Conclusion

The PowerWater® DNA Isolation Kit has been optimized for maximum yield, purity, and inhibitor removal. The kit can be utilized with a variety of water samples (marine, brackish, fresh, sewage) using common filter membrane types. The easy-to-use protocol can isolate pure DNA from water samples in < 25 min.

For further information, visit our website at www.mobio.com.

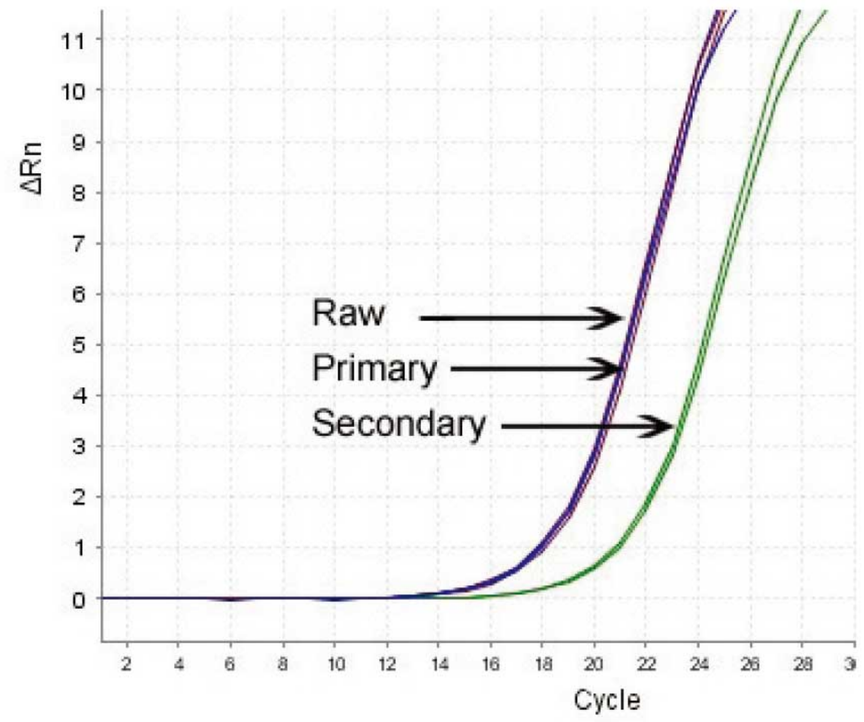

Figure 2. Real-time PCR results for raw, primary-treated, and secondary-treated sewage. Samples (50 mL each) were vacuum filtered, in duplicate, through 0.45 µm cellulose acetate filter membranes. DNA was isolated using the PowerWater® DNA Isolation Kit and total microbial DNA was detected with a SYBR green assay using universal 16S rDNA primers. Purified E. coli DNA was used as the standard with an assay efficiency of 90.8%. As expected, raw and primary treated sewage had significantly higher levels of bacteria compared to secondary treated sewage, as indicated by the lower Ct values.